

ABSTRACT OF THE DISCLOSURE

A capacitor fabrication method may include atomic layer depositing a conductive barrier layer to oxygen diffusion over the first electrode. A method may instead include chemisorbing a layer of a first precursor at least one monolayer thick over the first electrode and chemisorbing a layer of a second precursor at least one monolayer thick on the first precursor layer, a chemisorption product of the first and second precursor layers being comprised by a layer of a conductive barrier material. The barrier layer may be sufficiently thick and dense to reduce oxidation of the first electrode by oxygen diffusion from over the barrier layer. An alternative method may include forming a first capacitor electrode over a substrate, the first electrode having an inner surface area per unit area and an outer surface area per unit area that are both greater than an outer surface area per unit area of the substrate. A capacitor dielectric layer and a second capacitor electrode may be formed over the dielectric layer. The method may further include forming rugged polysilicon over the substrate, the first electrode being over the rugged polysilicon. Accordingly, the outer surface area of the first electrode can be at least 30% greater than the outer surface area of the substrate without the first electrode including polysilicon.